

Table J-70 lists estimated incident-free (vehicle emissions) impacts and traffic (accident) fatality impacts in Nevada for the transportation of materials, wastes, and workers (including repository-related commuter travel) for the construction, operation and monitoring, and closure of the repository that would occur for the receipt and emplacement of the materials in Inventory Modules 1 and 2. The range includes all lower-temperature repository operating mode scenarios.

**Table J-70.** Health impacts from transportation of materials, consumables, personnel, and waste for Modules 1 and 2.<sup>a</sup>

Phase	Kilometers traveled (millions) <sup>b</sup>	Traffic fatalities	Emission-related health effects
Construction	61 - 67	0.67 - 0.74	0.086 - 0.096
Emplacement and Development	510 - 640	8.5 - 9.8	0.78 - 0.92
Operation and Monitoring	150 - 480	1.9 - 6.1	0.24 - 0.79
Closure	59 - 97	0.65 - 1.0	0.084 - 0.13
<b>Totals</b>	<b>820 - 1,200</b>	<b>12 - 18</b>	<b>1.2 - 1.9</b>

a. Numbers are rounded.

b. To convert kilometers to miles, multiply by 0.62137.

c. Totals might not equal sums due to rounding.

Even with the increased transportation of the other materials included in Module 1 or 2, DOE expects that the transportation of materials, consumables, personnel, and waste to and from the repository would be minor contributors to all transportation on a local, state, and national level. Public and worker health impacts would be small from transportation accidents involving nonradioactive hazardous materials. On average, in the United States there is about 1 fatality caused by the hazardous material being transported for each 30 million shipments by all modes (DIRS 103717-DOT 1998, p. 1; DIRS 103720-DOT Undated, Exhibit 2b).

## J.4 State-Specific Impacts and Route Maps

This section contains maps and tables that illustrate the estimated impacts to 45 states and the District of Columbia (Alaska and Hawaii are not included; estimated impacts in Montana, North Dakota, and Rhode Island would be zero). As discussed previously in this appendix, DOE used state- and route-specific data to estimate transportation impacts. At this time, about 10 years before shipments could begin, DOE has not determined the specific routes it would use to ship spent nuclear fuel and high-level radioactive waste to the proposed repository. Therefore, the transportation routes discussed in this section might not be the exact routes actually used for shipments to Yucca Mountain. Nevertheless, because the analysis is based primarily on the existing Interstate Highway System and rail rolling stock, the analysis presents a representative estimate of what the actual transportation impacts would likely be.

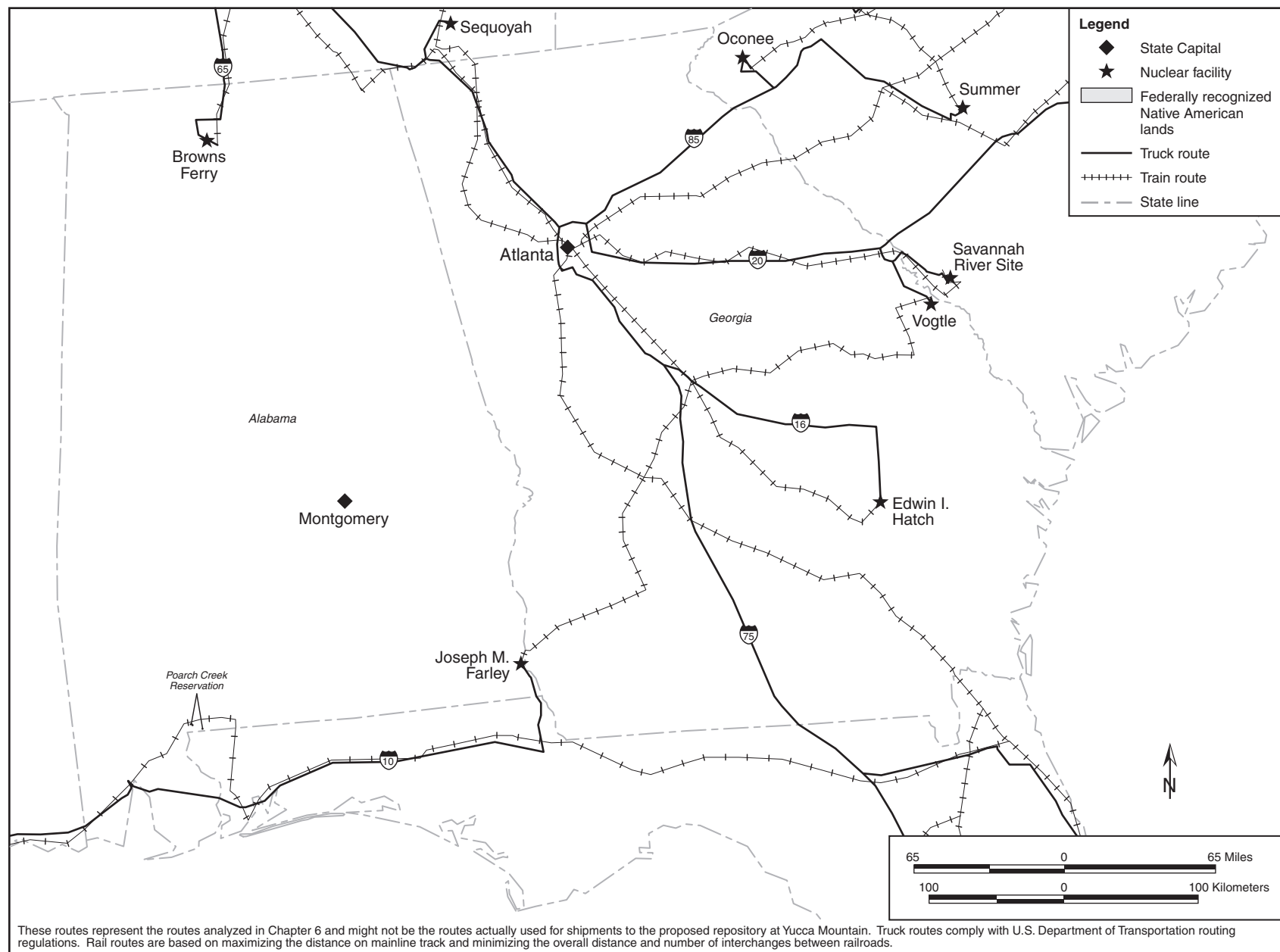
In addition, under the national mostly rail transportation scenario, potential impacts in each state vary according to the ending node in Nevada. There are six different points of transfer from national to Nevada transportation (Caliente, Dry Lake, Jean, Beowawe, Eccles, and Apex). The routes used in the national analysis depend on the transfer point through which the shipments would pass. Tables J-71 through J-92 list the transportation impacts for 47 of the states and the District of Columbia, and Figures J-31 through J-52 are maps of the routes analyzed for each region.

In Nevada, the impacts vary according to the rail or heavy-haul implementing alternative. Figure J-53 shows the potential routes in the State of Nevada, and Table J-93 lists the impacts in Nevada for each of the eight implementing alternatives.

**Table J-71.** Estimated transportation impacts for the States of Alabama and Georgia.

State and impact category	Mostly legal-weight truck	Mostly rail					
		Ending rail node in Nevada <sup>a</sup>					
		Caliente <sup>b</sup>	Dry Lake <sup>c</sup>	Jean <sup>d</sup>	Beowawe <sup>e</sup>	Eccles <sup>f</sup>	Apex <sup>g</sup>
ALABAMA							
<i>Shipments</i>							
Truck (originating/total)	1,755/1,755	0/0	0/0	0/0	0/0	0/0	0/0
Rail (originating/total)	0/0	283/2,413	283/2,413	283/2,413	283/2,413	283/2,413	283/2,413
<i>Radiological impacts</i>							
Incident-free impacts							
Population (person-rem/LCFs) <sup>h</sup>	5.0×10 <sup>0</sup> /2.5×10 <sup>-3</sup>	3.7×10 <sup>1</sup> /1.8×10 <sup>-3</sup>	3.7×10 <sup>1</sup> /1.8×10 <sup>-3</sup>	4.9×10 <sup>0</sup> /2.4×10 <sup>-3</sup>	3.7×10 <sup>1</sup> /1.8×10 <sup>-3</sup>	3.7×10 <sup>1</sup> /1.8×10 <sup>-3</sup>	3.7×10 <sup>1</sup> /1.8×10 <sup>-3</sup>
Workers (person-rem/LCFs)	4.2×10 <sup>1</sup> /1.7×10 <sup>-2</sup>	2.1×10 <sup>1</sup> /8.2×10 <sup>-3</sup>	2.1×10 <sup>1</sup> /8.2×10 <sup>-3</sup>	2.2×10 <sup>1</sup> /8.8×10 <sup>-3</sup>	2.1×10 <sup>1</sup> /8.2×10 <sup>-3</sup>	2.1×10 <sup>1</sup> /8.2×10 <sup>-3</sup>	2.1×10 <sup>1</sup> /8.2×10 <sup>-3</sup>
Accident dose risk							
Population (person-rem/LCFs)	4.6×10 <sup>-4</sup> /2.3×10 <sup>-7</sup>	3.1×10 <sup>-4</sup> /1.5×10 <sup>-7</sup>	3.1×10 <sup>-4</sup> /1.5×10 <sup>-7</sup>	7.0×10 <sup>-4</sup> /3.5×10 <sup>-7</sup>	3.1×10 <sup>-4</sup> /1.5×10 <sup>-7</sup>	3.1×10 <sup>-4</sup> /1.5×10 <sup>-7</sup>	3.1×10 <sup>-4</sup> /1.5×10 <sup>-7</sup>
<i>Nonradiological impacts</i>							
Vehicle emissions (LCFs)	1.0×10 <sup>-3</sup>	8.4×10 <sup>-4</sup>	8.4×10 <sup>-4</sup>	1.4×10 <sup>-3</sup>	8.4×10 <sup>-4</sup>	8.4×10 <sup>-4</sup>	8.4×10 <sup>-4</sup>
Fatalities	0.003	0.009	0.009	0.011	0.009	0.009	0.009
GEORGIA							
<i>Shipments</i>							
Truck (originating/total)	1,664/13,169	0/491	0/491	0/491	0/491	0/491	0/491
Rail (originating/total)	0/0	321/2,561	321/2,561	321/2,359	321/2,561	321/2,561	321/2,561
<i>Radiological impacts</i>							
Incident-free impacts							
Population (person-rem/LCFs) <sup>h</sup>	2.2×10 <sup>2</sup> /1.1×10 <sup>-1</sup>	1.0×10 <sup>2</sup> /5.0×10 <sup>-2</sup>	1.0×10 <sup>2</sup> /5.0×10 <sup>-2</sup>	9.4×10 <sup>1</sup> /4.7×10 <sup>-2</sup>	1.0×10 <sup>2</sup> /5.0×10 <sup>-2</sup>	1.0×10 <sup>2</sup> /5.0×10 <sup>-2</sup>	1.0×10 <sup>2</sup> /5.0×10 <sup>-2</sup>
Workers (person-rem/LCFs)	4.0×10 <sup>2</sup> /1.6×10 <sup>-1</sup>	1.2×10 <sup>2</sup> /4.8×10 <sup>-2</sup>	1.2×10 <sup>2</sup> /4.8×10 <sup>-2</sup>	1.1×10 <sup>2</sup> /4.4×10 <sup>-2</sup>	1.2×10 <sup>2</sup> /4.8×10 <sup>-2</sup>	1.2×10 <sup>2</sup> /4.8×10 <sup>-2</sup>	1.2×10 <sup>2</sup> /4.8×10 <sup>-2</sup>
Accident dose risk							
Population (person-rem/LCFs)	5.6×10 <sup>-2</sup> /2.8×10 <sup>-5</sup>	1.4×10 <sup>-2</sup> /7.2×10 <sup>-6</sup>	1.4×10 <sup>-2</sup> /7.2×10 <sup>-6</sup>	1.2×10 <sup>-2</sup> /6.1×10 <sup>-6</sup>	1.4×10 <sup>-2</sup> /7.2×10 <sup>-6</sup>	1.4×10 <sup>-2</sup> /7.2×10 <sup>-6</sup>	1.4×10 <sup>-2</sup> /7.2×10 <sup>-6</sup>
<i>Nonradiological impacts</i>							
Vehicle emissions (LCFs)	6.4×10 <sup>-2</sup>	4.8×10 <sup>-2</sup>	4.8×10 <sup>-2</sup>	4.4×10 <sup>-2</sup>	4.8×10 <sup>-2</sup>	4.8×10 <sup>-2</sup>	4.8×10 <sup>-2</sup>
Fatalities	0.22	0.10	0.10	0.09	0.10	0.10	0.10

- Under the mostly rail scenario, rail shipments would arrive in Nevada at one of six existing rail nodes. Impacts would vary according to the node. From that node, DOE would use one of the rail or heavy-haul implementing alternatives to complete the transportation to Yucca Mountain (see Section J.1.2).
- For heavy-haul truck transportation, the Caliente junction is the location of the proposed Caliente intermodal transfer station for heavy-haul trucks near the town of Caliente in eastern Nevada. Rail shipments terminating at this junction would continue to Yucca Mountain on heavy-haul trucks on one of the Caliente, Caliente/Chalk Mountain, or Caliente/Las Vegas routes. For branch rail line transportation, railcars would transfer via the Caliente Option to the Caliente Corridor at the Caliente junction.
- For heavy-haul truck transportation, the Dry Lake junction is near the location of the proposed Apex/Dry Lake intermodal transfer station for heavy-haul trucks in southeast Nevada. Rail shipments terminating at this junction would continue to Yucca Mountain on heavy-haul trucks on the Apex/Dry Lake route.
- For heavy-haul truck transportation, the Jean junction is near the location of the proposed Sloan/Jean intermodal transfer station for heavy-haul trucks in southern Nevada. Rail shipments terminating at this junction would continue to Yucca Mountain on heavy-haul trucks on the Sloan/Jean route. For branch rail line transportation, railcars would transfer from the mainline railroad via the Wilson Pass or Stateline Pass Option of the Jean Corridor, near the Jean junction.
- For branch rail line transportation, railcars would transfer from the mainline railroad at the Beowawe junction in north-central Nevada to the Carlin Corridor.
- For branch rail line transportation, railcars would transfer from the mainline railroad at the Eccles junction east of Caliente, Nevada, via the Eccles Option or nearby via the Crestline Option of the Caliente or Caliente-Chalk Mountain Corridor. Impacts in states outside Nevada would be the same for the Eccles and Crestline Options of the Caliente and Caliente-Chalk Mountain Corridors.
- For branch rail line transportation, railcars would transfer from the mainline railroad at the Apex junction in southeast Nevada, possibly via the Valley Connection, to the Valley Modified Corridor.
- LCF = latent cancer fatality.

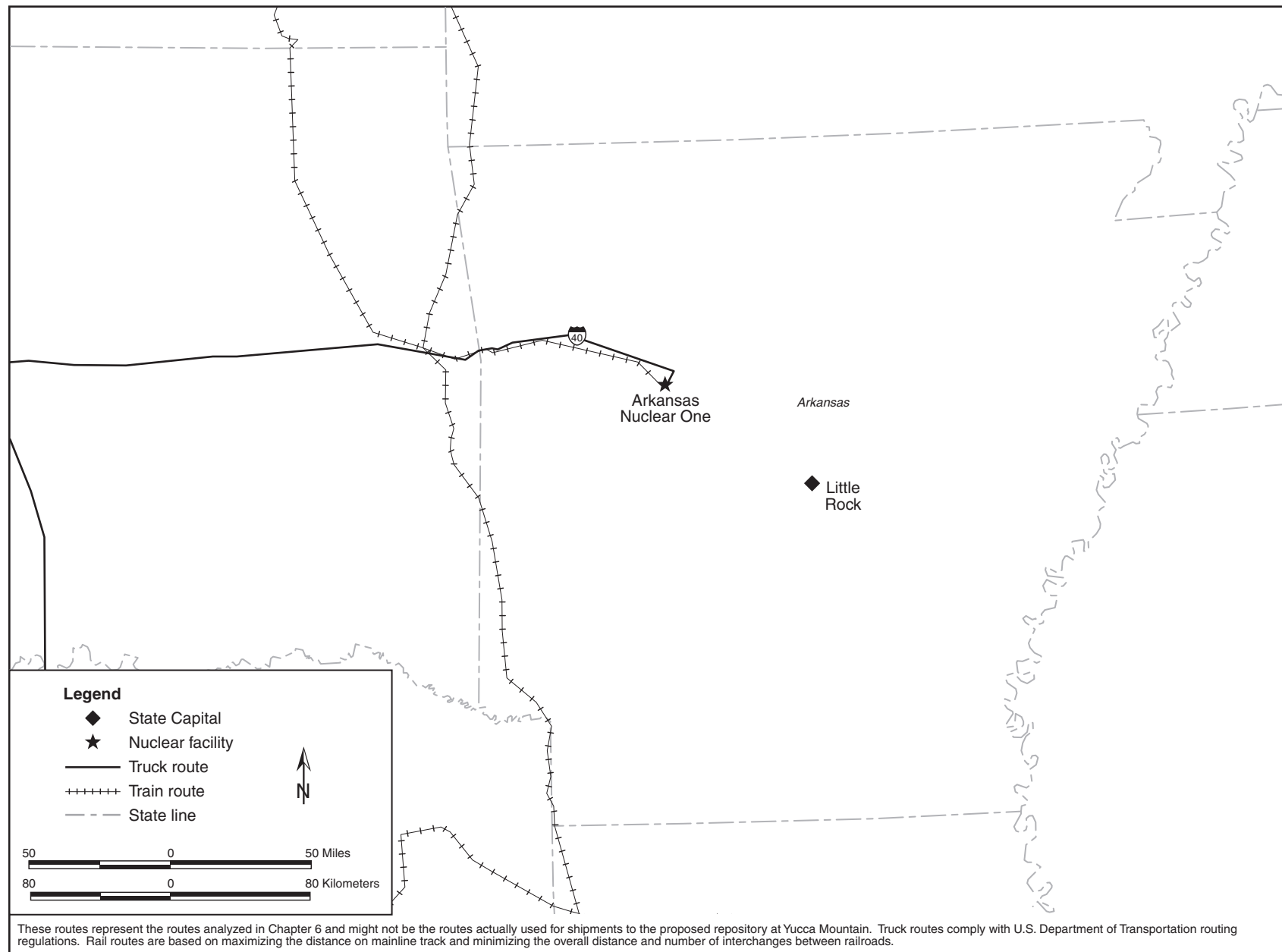


**Figure J-31.** Highway and rail routes used to analyze transportation impacts - Alabama and Georgia.

**Table J-72.** Estimated transportation impacts for the State of Arkansas.

Impact category	Mostly legal-weight truck	Mostly rail					
		Ending rail node in Nevada <sup>a</sup>					
		Caliente <sup>b</sup>	Dry Lake <sup>c</sup>	Jean <sup>d</sup>	Beowawe <sup>e</sup>	Eccles <sup>f</sup>	Apex <sup>g</sup>
ARKANSAS							
<i>Shipments</i>							
Truck (originating/total)	794/794	0/0	0/0	0/0	0/0	0/0	0/0
Rail (originating/total)	0/0	121/201	121/201	121/121	121/258	121/201	121/201
<i>Radiological impacts</i>							
<i>Incident-free impacts</i>							
Population (person-rem/LCFs) <sup>h</sup>	2.3×10 <sup>0</sup> /1.1×10 <sup>-3</sup>	1.1×10 <sup>0</sup> /5.4×10 <sup>-4</sup>	1.1×10 <sup>0</sup> /5.4×10 <sup>-4</sup>	9.5×10 <sup>-1</sup> /4.8×10 <sup>-4</sup>	1.2×10 <sup>0</sup> /5.8×10 <sup>-4</sup>	1.1×10 <sup>0</sup> /5.4×10 <sup>-4</sup>	1.1×10 <sup>0</sup> /5.4×10 <sup>-4</sup>
Workers (person-rem/LCFs)	2.1×10 <sup>1</sup> /8.3×10 <sup>-3</sup>	7.8×10 <sup>0</sup> /3.1×10 <sup>-3</sup>	7.8×10 <sup>0</sup> /3.1×10 <sup>-3</sup>	6.6×10 <sup>0</sup> /2.6×10 <sup>-3</sup>	8.7×10 <sup>0</sup> /3.5×10 <sup>-3</sup>	7.8×10 <sup>0</sup> /3.1×10 <sup>-3</sup>	7.8×10 <sup>0</sup> /3.1×10 <sup>-3</sup>
<i>Accident dose risk</i>							
Population (person-rem/LCFs)	4.6×10 <sup>-5</sup> /2.3×10 <sup>-8</sup>	3.8×10 <sup>-4</sup> /1.9×10 <sup>-7</sup>	3.8×10 <sup>-4</sup> /1.9×10 <sup>-7</sup>	2.4×10 <sup>-4</sup> /1.2×10 <sup>-7</sup>	4.7×10 <sup>-4</sup> /2.4×10 <sup>-7</sup>	3.8×10 <sup>-4</sup> /1.9×10 <sup>-7</sup>	3.8×10 <sup>-4</sup> /1.9×10 <sup>-7</sup>
<i>Nonradiological impacts</i>							
Vehicle emissions (LCFs)	1.9×10 <sup>-4</sup>	2.0×10 <sup>-4</sup>	2.0×10 <sup>-4</sup>	1.3×10 <sup>-4</sup>	2.4×10 <sup>-4</sup>	2.0×10 <sup>-4</sup>	2.0×10 <sup>-4</sup>
Fatalities	1.2×10 <sup>-3</sup>	3.7×10 <sup>-3</sup>	3.7×10 <sup>-3</sup>	1.6×10 <sup>-3</sup>	5.3×10 <sup>-3</sup>	3.7×10 <sup>-3</sup>	3.7×10 <sup>-3</sup>

- a. Under the mostly rail scenario, rail shipments would arrive in Nevada at one of six existing rail nodes. Impacts would vary according to the node. From that node, DOE would use one of the rail or heavy-haul implementing alternatives to complete the transportation to Yucca Mountain (see Section J.1.2).
- b. For heavy-haul truck transportation, the Caliente junction is the location of the proposed Caliente intermodal transfer station for heavy-haul trucks near the town of Caliente in eastern Nevada. Rail shipments terminating at this junction would continue to Yucca Mountain on heavy-haul trucks on one of the Caliente, Caliente/Chalk Mountain, or Caliente/Las Vegas routes. For branch rail line transportation, railcars would transfer via the Caliente Option to the Caliente Corridor at the Caliente junction.
- c. For heavy-haul truck transportation, the Dry Lake junction is near the location of the proposed Apex/Dry Lake intermodal transfer station for heavy-haul trucks in southeast Nevada. Rail shipments terminating at this junction would continue to Yucca Mountain on heavy-haul trucks on the Apex/Dry Lake route.
- d. For heavy-haul truck transportation, the Jean junction is near the location of the proposed Sloan/Jean intermodal transfer station for heavy-haul trucks in southern Nevada. Rail shipments terminating at this junction would continue to Yucca Mountain on heavy-haul trucks on the Sloan/Jean route. For branch rail line transportation, railcars would transfer from the mainline railroad via the Wilson Pass or Stateline Pass Option of the Jean Corridor, near the Jean junction.
- e. For branch rail line transportation, railcars would transfer from the mainline railroad at the Beowawe junction in north-central Nevada to the Carlin Corridor.
- f. For branch rail line transportation, railcars would transfer from the mainline railroad at the Eccles junction east of Caliente, Nevada, via the Eccles Option or nearby via the Crestline Option of the Caliente or Caliente-Chalk Mountain Corridor. Impacts in states outside Nevada would be the same for the Eccles and Crestline Options of the Caliente and Caliente-Chalk Mountain Corridors.
- g. For branch rail line transportation, railcars would transfer from the mainline railroad at the Apex junction in southeast Nevada, possibly via the Valley Connection, to the Valley Modified Corridor.
- h. LCF = latent cancer fatality.

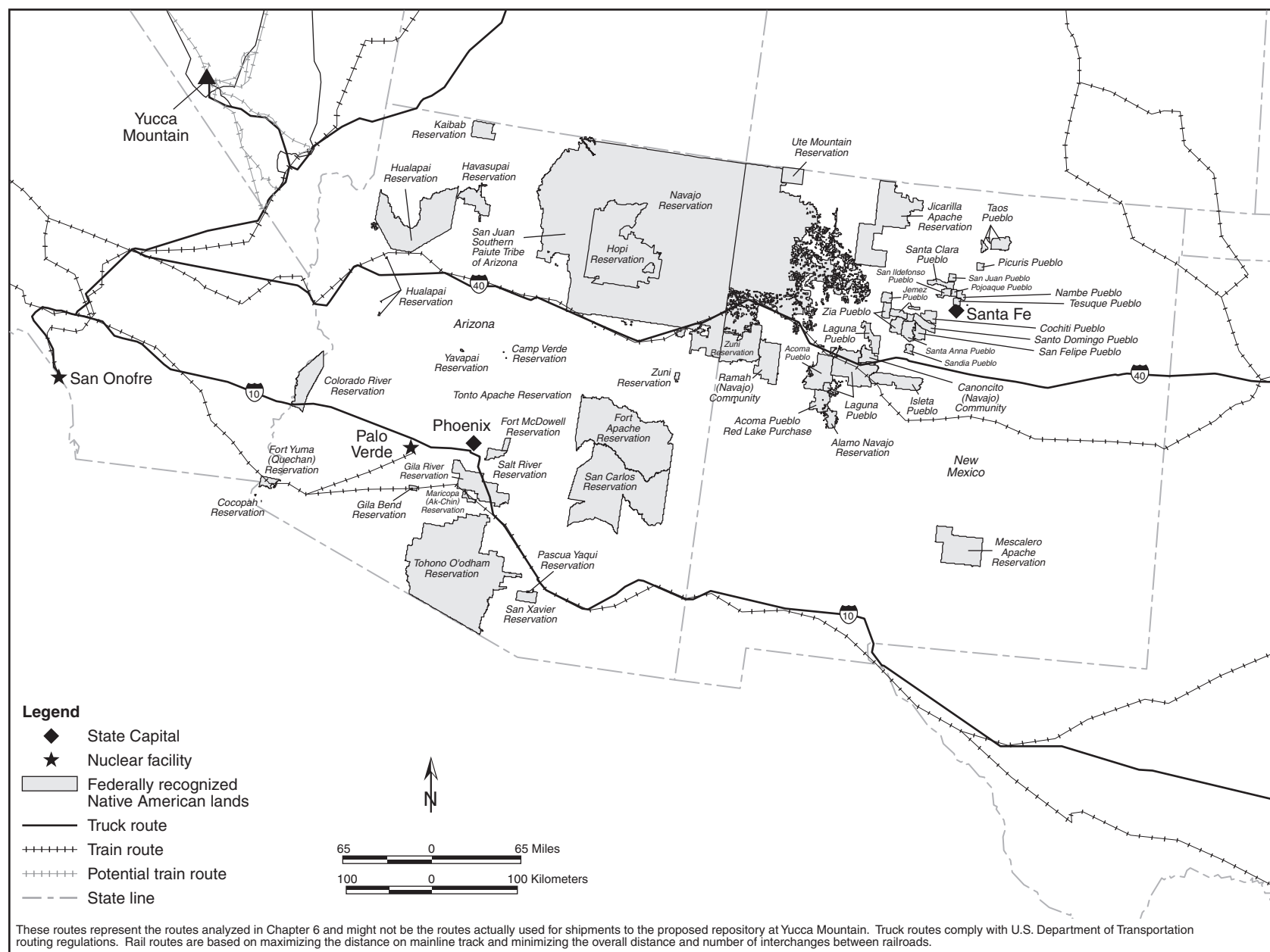


**Figure J-32.** Highway and rail routes used to analyze transportation impacts - Arkansas.

**Table J-73.** Estimated transportation impacts for the States of Arizona and New Mexico.

Impact category	Mostly legal-weight truck	Mostly rail					
		Ending rail node in Nevada <sup>a</sup>					
		Caliente <sup>b</sup>	Dry Lake <sup>c</sup>	Jean <sup>d</sup>	Beowawe <sup>e</sup>	Eccles <sup>f</sup>	Apex <sup>g</sup>
ARIZONA							
<i>Shipments</i>							
Truck (originating/total)	1,118/51,036	0/1,079	0/1,079	0/1,079	0/1,079	0/1,079	0/1,079
Rail (originating/total)	0/0	193/374	193/431	193/1,145	193/193	193/308	193/585
<i>Radiological impacts</i>							
Incident-free impacts							
Population (person-rem/LCFs) <sup>h</sup>	9.2×10 <sup>1</sup> /4.6×10 <sup>-2</sup>	5.5×10 <sup>0</sup> /2.7×10 <sup>-3</sup>	6.1×10 <sup>0</sup> /3.1×10 <sup>-3</sup>	1.3×10 <sup>1</sup> /6.7×10 <sup>-3</sup>	3.4×10 <sup>0</sup> /1.7×10 <sup>-3</sup>	4.7×10 <sup>0</sup> /2.3×10 <sup>-3</sup>	7.9×10 <sup>0</sup> /4.0×10 <sup>-3</sup>
Workers (person-rem/LCFs)	3.2×10 <sup>2</sup> /1.3×10 <sup>-1</sup>	2.3×10 <sup>1</sup> /9.0×10 <sup>-3</sup>	2.5×10 <sup>1</sup> /1.0×10 <sup>-2</sup>	5.5×10 <sup>1</sup> /2.2×10 <sup>-2</sup>	1.5×10 <sup>1</sup> /6.0×10 <sup>-3</sup>	2.0×10 <sup>1</sup> /7.9×10 <sup>-3</sup>	3.1×10 <sup>1</sup> /1.3×10 <sup>-2</sup>
Accident dose risk							
Population (person-rem/LCFs)	1.2×10 <sup>-3</sup> /6.1×10 <sup>-7</sup>	3.6×10 <sup>-4</sup> /1.8×10 <sup>-7</sup>	4.7×10 <sup>-4</sup> /2.3×10 <sup>-7</sup>	1.7×10 <sup>-3</sup> /8.5×10 <sup>-7</sup>	3.8×10 <sup>-5</sup> /1.9×10 <sup>-8</sup>	2.3×10 <sup>-4</sup> /1.2×10 <sup>-7</sup>	6.7×10 <sup>-4</sup> /3.4×10 <sup>-7</sup>
<i>Nonradiological impacts</i>							
Vehicle emissions (LCFs)	6.2×10 <sup>-3</sup>	1.2×10 <sup>-3</sup>	1.5×10 <sup>-3</sup>	5.1×10 <sup>-3</sup>	1.1×10 <sup>-4</sup>	7.8×10 <sup>-4</sup>	2.4×10 <sup>-3</sup>
Fatalities	8.9×10 <sup>-2</sup>	7.8×10 <sup>-3</sup>	9.4×10 <sup>-3</sup>	2.9×10 <sup>-2</sup>	2.8×10 <sup>-3</sup>	6.0×10 <sup>-3</sup>	1.4×10 <sup>-2</sup>
NEW MEXICO							
<i>Shipments</i>							
Truck (originating/total)	0/3,999	0/0	0/0	0/0	0/0	0/0	0/0
Rail (originating/total)	0/0	0/181	0/238	0/952	0/154	0/115	0/392
<i>Radiological impacts</i>							
Incident-free impacts							
Population (person-rem/LCFs) <sup>h</sup>	5.5×10 <sup>1</sup> /2.8×10 <sup>-2</sup>	3.4×10 <sup>-1</sup> /1.7×10 <sup>-4</sup>	4.4×10 <sup>-1</sup> /2.2×10 <sup>-4</sup>	2.3×10 <sup>0</sup> /1.2×10 <sup>-3</sup>	9.2×10 <sup>-3</sup> /4.6×10 <sup>-6</sup>	2.1×10 <sup>-1</sup> /1.1×10 <sup>-4</sup>	7.3×10 <sup>-1</sup> /3.6×10 <sup>-4</sup>
Workers (person-rem/LCFs)	1.4×10 <sup>2</sup> /5.8×10 <sup>-2</sup>	3.1×10 <sup>0</sup> /1.2×10 <sup>-3</sup>	4.0×10 <sup>0</sup> /1.6×10 <sup>-3</sup>	2.3×10 <sup>1</sup> /9.3×10 <sup>-3</sup>	1.3×10 <sup>1</sup> /5.2×10 <sup>-4</sup>	1.9×10 <sup>1</sup> /7.8×10 <sup>-4</sup>	6.6×10 <sup>0</sup> /2.7×10 <sup>-3</sup>
Accident dose risk							
Population (person-rem/LCFs)	1.6×10 <sup>-3</sup> /8.2×10 <sup>-7</sup>	3.9×10 <sup>-5</sup> /2.0×10 <sup>-8</sup>	5.3×10 <sup>-5</sup> /2.7×10 <sup>-8</sup>	3.0×10 <sup>-4</sup> /1.5×10 <sup>-7</sup>	1.2×10 <sup>-6</sup> /6.1×10 <sup>-10</sup>	2.4×10 <sup>-5</sup> /1.2×10 <sup>-8</sup>	7.9×10 <sup>-5</sup> /3.9×10 <sup>-8</sup>
<i>Nonradiological impacts</i>							
Vehicle emissions (LCFs)	1.0×10 <sup>-2</sup>	1.9×10 <sup>-4</sup>	2.4×10 <sup>-4</sup>	1.3×10 <sup>-3</sup>	4.3×10 <sup>-6</sup>	1.2×10 <sup>-4</sup>	4.0×10 <sup>-4</sup>
Fatalities	0.053	0.001	0.002	0.010	0.001	0.001	0.003

- Under the mostly rail scenario, rail shipments would arrive in Nevada at one of six existing rail nodes. Impacts would vary according to the node. From that node, DOE would use one of the rail or heavy-haul implementing alternatives to complete the transportation to Yucca Mountain (see Section J.1.2).
- For heavy-haul truck transportation, the Caliente junction is the location of the proposed Caliente intermodal transfer station for heavy-haul trucks near the town of Caliente in eastern Nevada. Rail shipments terminating at this junction would continue to Yucca Mountain on heavy-haul trucks on one of the Caliente, Caliente/Chalk Mountain, or Caliente/Las Vegas routes. For branch rail line transportation, railcars would transfer via the Caliente Option to the Caliente Corridor at the Caliente junction.
- For heavy-haul truck transportation, the Dry Lake junction is near the location of the proposed Apex/Dry Lake intermodal transfer station for heavy-haul trucks in southeast Nevada. Rail shipments terminating at this junction would continue to Yucca Mountain on heavy-haul trucks on the Apex/Dry Lake route.
- For heavy-haul truck transportation, the Jean junction is near the location of the proposed Sloan/Jean intermodal transfer station for heavy-haul trucks in southern Nevada. Rail shipments terminating at this junction would continue to Yucca Mountain on heavy-haul trucks on the Sloan/Jean route. For branch rail line transportation, railcars would transfer from the mainline railroad via the Wilson Pass or Stateline Pass Option of the Jean Corridor, near the Jean junction.
- For branch rail line transportation, railcars would transfer from the mainline railroad at the Beowawe junction in north-central Nevada to the Carlin Corridor.
- For branch rail line transportation, railcars would transfer from the mainline railroad at the Eccles junction east of Caliente, Nevada, via the Eccles Option or nearby via the Crestline Option of the Caliente or Caliente-Chalk Mountain Corridor. Impacts in states outside Nevada would be the same for the Eccles and Crestline Options of the Caliente and Caliente-Chalk Mountain Corridors.
- For branch rail line transportation, railcars would transfer from the mainline railroad at the Apex junction in southeast Nevada, possibly via the Valley Connection, to the Valley Modified Corridor.
- LCF = latent cancer fatality.

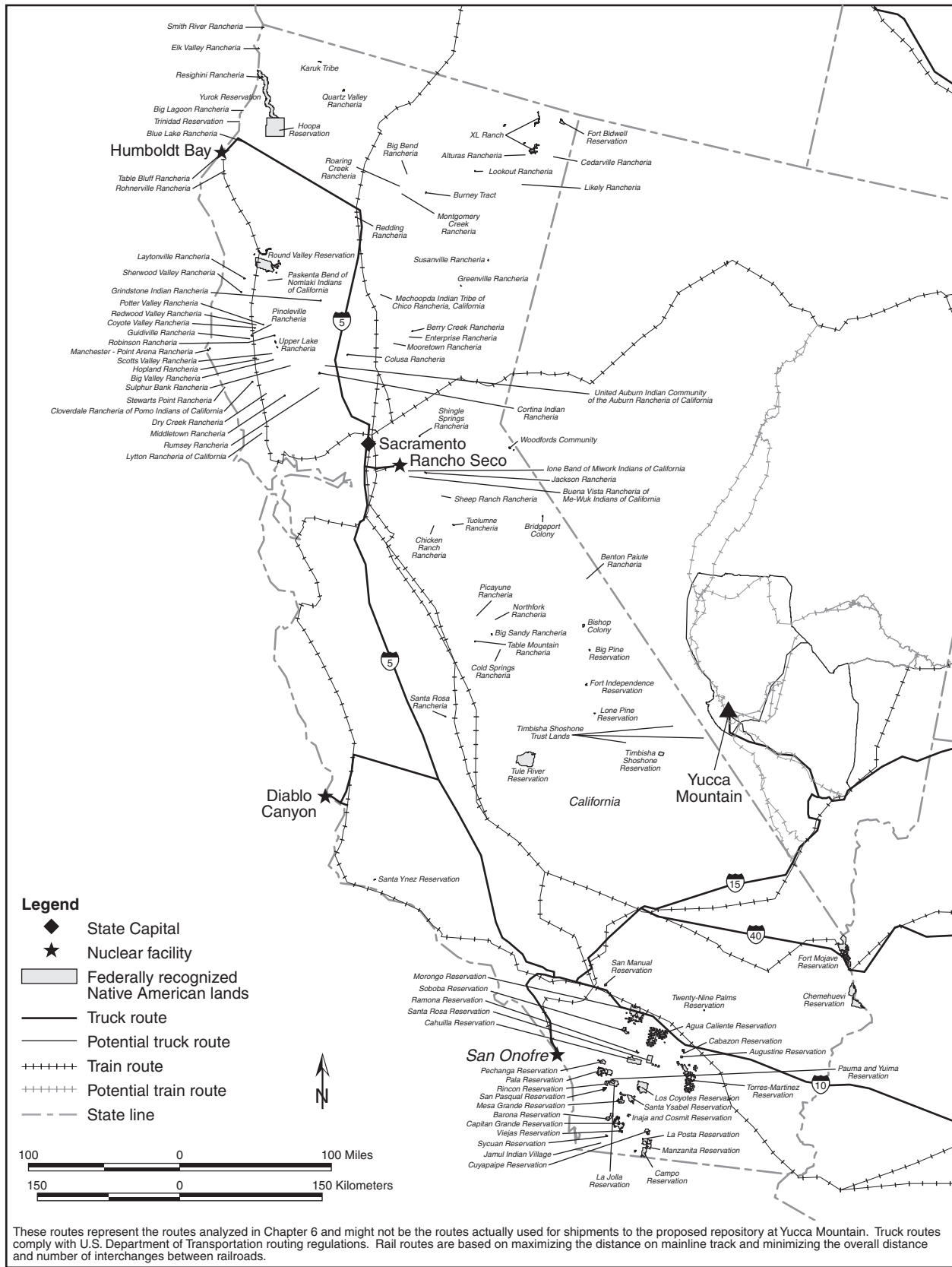


**Figure J-33.** Highway and rail routes used to analyze transportation impacts - Arizona and New Mexico.

**Table J-74.** Estimated transportation impacts for the State of California.

Impact category	Mostly legal-weight truck	Mostly rail					
		Ending rail node in Nevada <sup>a</sup>					
		Caliente <sup>b</sup>	Dry Lake <sup>c</sup>	Jean <sup>d</sup>	Beowawe <sup>e</sup>	Eccles <sup>f</sup>	Apex <sup>g</sup>
CALIFORNIA							
<i>Shipments</i>							
Truck (originating/total)	1,750/6,867	0/0	0/0	0/0	0/0	0/0	0/0
Rail (originating/total)	0/0	286/660	286/750	286/1,464	286/512	286/594	286/904
<i>Radiological impacts</i>							
Incident-free impacts							
Population (person-rem/LCFs) <sup>h</sup>	1.3×10 <sup>2</sup> /6.3×10 <sup>-2</sup>	4.8×10 <sup>1</sup> /2.4×10 <sup>-2</sup>	5.3×10 <sup>1</sup> /2.6×10 <sup>-2</sup>	6.6×10 <sup>1</sup> /3.3×10 <sup>-2</sup>	6.9×10 <sup>1</sup> /3.4×10 <sup>-2</sup>	4.6×10 <sup>1</sup> /2.3×10 <sup>-2</sup>	5.7×10 <sup>1</sup> /2.9×10 <sup>-2</sup>
Workers (person-rem/LCFs)	2.7×10 <sup>2</sup> /1.1×10 <sup>-1</sup>	4.5×10 <sup>1</sup> /1.8×10 <sup>-2</sup>	5.0×10 <sup>1</sup> /2.0×10 <sup>-2</sup>	7.7×10 <sup>1</sup> /3.1×10 <sup>-2</sup>	5.2×10 <sup>1</sup> /2.1×10 <sup>-2</sup>	4.2×10 <sup>1</sup> /1.7×10 <sup>-2</sup>	5.7×10 <sup>1</sup> /2.3×10 <sup>-2</sup>
Accident dose risk							
Population (person-rem/LCFs)	9.7×10 <sup>-3</sup> /4.9×10 <sup>-6</sup>	2.2×10 <sup>-2</sup> /1.1×10 <sup>-5</sup>	2.5×10 <sup>-2</sup> /1.3×10 <sup>-5</sup>	3.2×10 <sup>-2</sup> /1.6×10 <sup>-5</sup>	3.4×10 <sup>-2</sup> /1.7×10 <sup>-5</sup>	2.1×10 <sup>-2</sup> /1.1×10 <sup>-5</sup>	2.7×10 <sup>-2</sup> /1.3×10 <sup>-5</sup>
<i>Nonradiological impacts</i>							
Vehicle emissions (LCFs)	4.3×10 <sup>-2</sup>	2.1×10 <sup>-2</sup>	2.3×10 <sup>-2</sup>	3.0×10 <sup>-2</sup>	3.1×10 <sup>-2</sup>	2.0×10 <sup>-2</sup>	2.5×10 <sup>-2</sup>
Fatalities	0.052	0.061	0.073	0.131	0.073	0.055	0.087

- a. Under the mostly rail scenario, rail shipments would arrive in Nevada at one of six existing rail nodes. Impacts would vary according to the node. From that node, DOE would use one of the rail or heavy-haul implementing alternatives to complete the transportation to Yucca Mountain (see Section J.1.2).
- b. For heavy-haul truck transportation, the Caliente junction is the location of the proposed Caliente intermodal transfer station for heavy-haul trucks near the town of Caliente in eastern Nevada. Rail shipments terminating at this junction would continue to Yucca Mountain on heavy-haul trucks on one of the Caliente, Caliente/Chalk Mountain, or Caliente/Las Vegas routes. For branch rail line transportation, railcars would transfer via the Caliente Option to the Caliente Corridor at the Caliente junction.
- c. For heavy-haul truck transportation, the Dry Lake junction is near the location of the proposed Apex/Dry Lake intermodal transfer station for heavy-haul trucks in southeast Nevada. Rail shipments terminating at this junction would continue to Yucca Mountain on heavy-haul trucks on the Apex/Dry Lake route.
- d. For heavy-haul truck transportation, the Jean junction is near the location of the proposed Sloan/Jean intermodal transfer station for heavy-haul trucks in southern Nevada. Rail shipments terminating at this junction would continue to Yucca Mountain on heavy-haul trucks on the Sloan/Jean route. For branch rail line transportation, railcars would transfer from the mainline railroad via the Wilson Pass or Stateline Pass Option of the Jean Corridor, near the Jean junction.
- e. For branch rail line transportation, railcars would transfer from the mainline railroad at the Beowawe junction in north-central Nevada to the Carlin Corridor.
- f. For branch rail line transportation, railcars would transfer from the mainline railroad at the Eccles junction east of Caliente, Nevada, via the Eccles Option or nearby via the Crestline Option of the Caliente or Caliente-Chalk Mountain Corridor. Impacts in states outside Nevada would be the same for the Eccles and Crestline Options of the Caliente and Caliente-Chalk Mountain Corridors.
- g. For branch rail line transportation, railcars would transfer from the mainline railroad at the Apex junction in southeast Nevada, possibly via the Valley Connection, to the Valley Modified Corridor.
- h. LCF = latent cancer fatality.



**Figure J-34.** Highway and rail routes used to analyze transportation impacts - California.

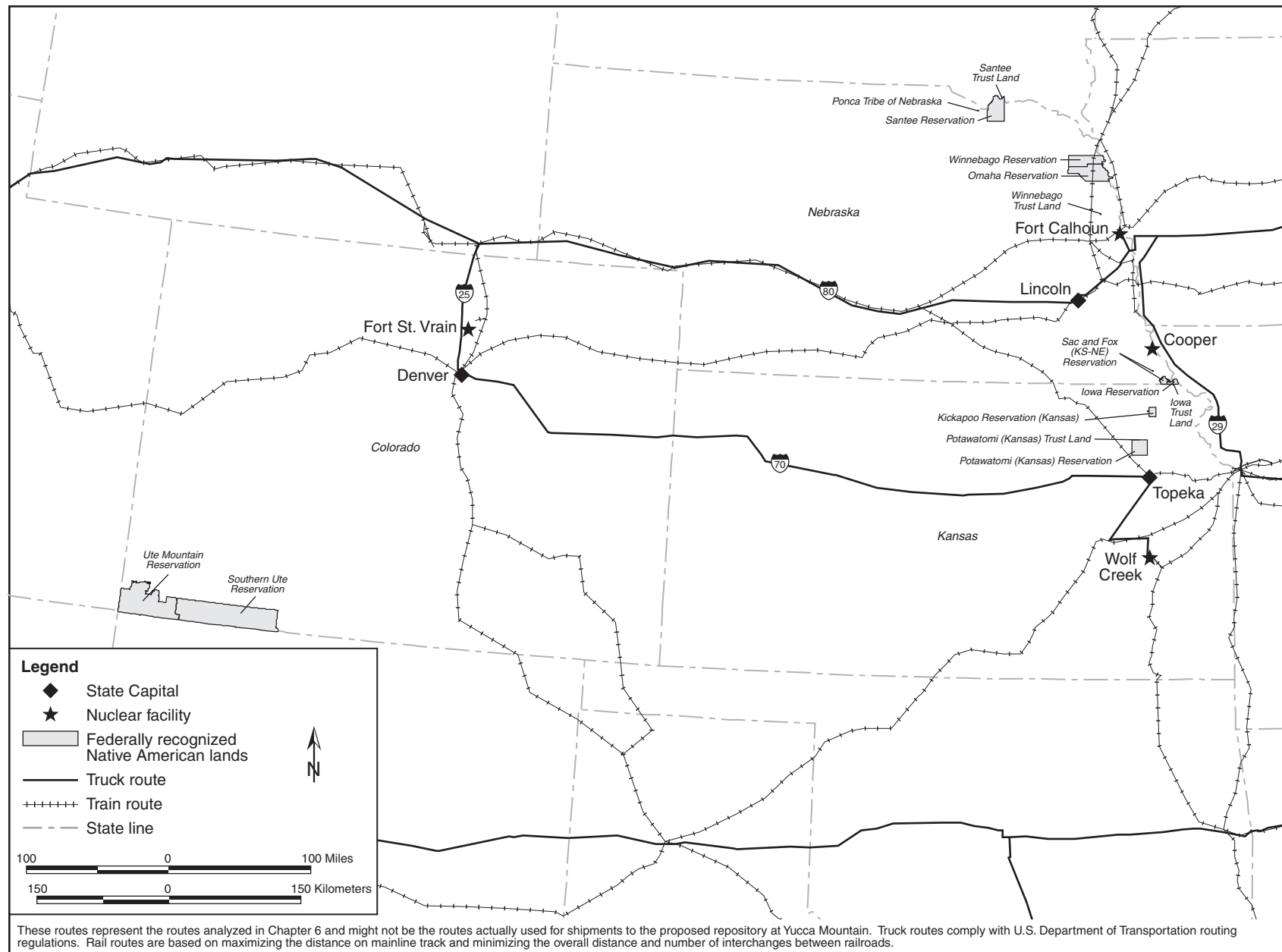
**Table J-75.** Estimated transportation impacts for the States of Colorado, Kansas, and Nebraska (page 1 of 2).

Impact category	Mostly legal-weight truck	Mostly rail					
		Ending rail node in Nevada <sup>a</sup>					
		Caliente <sup>b</sup>	Dry Lake <sup>c</sup>	Jean <sup>d</sup>	Beowawe <sup>e</sup>	Eccles <sup>f</sup>	Apex <sup>g</sup>
COLORADO							
<i>Shipments</i>							
Truck (originating/total)	312/708	0/0	0/0	0/0	0/0	0/0	0/0
Rail (originating/total)	0/0	36/7,904	36/7,847	36/7,133	36/8,085	36/7,970	36/7,693
<i>Radiological impacts</i>							
Incident-free impacts							
Population (person-rem/LCFs) <sup>h</sup>	4.4×10 <sup>0</sup> /2.2×10 <sup>-3</sup>	1.6×10 <sup>1</sup> /8.2×10 <sup>-3</sup>	1.4×10 <sup>1</sup> /7.1×10 <sup>-3</sup>	3.2×10 <sup>0</sup> /1.6×10 <sup>-3</sup>	2.0×10 <sup>1</sup> /1.0×10 <sup>-2</sup>	1.9×10 <sup>1</sup> /9.4×10 <sup>-3</sup>	8.5×10 <sup>0</sup> /4.3×10 <sup>-3</sup>
Workers (person-rem/LCFs)	1.8×10 <sup>1</sup> /7.4×10 <sup>-3</sup>	4.0×10 <sup>1</sup> /1.6×10 <sup>-2</sup>	3.7×10 <sup>1</sup> /1.5×10 <sup>-2</sup>	1.2×10 <sup>1</sup> /4.9×10 <sup>-3</sup>	4.7×10 <sup>1</sup> /1.9×10 <sup>-2</sup>	4.5×10 <sup>1</sup> /1.8×10 <sup>-2</sup>	2.7×10 <sup>1</sup> /1.1×10 <sup>-2</sup>
Accident dose risk							
Population (person-rem/LCFs)	3.4×10 <sup>-4</sup> /1.7×10 <sup>-7</sup>	5.2×10 <sup>-3</sup> /2.6×10 <sup>-6</sup>	4.4×10 <sup>-3</sup> /2.2×10 <sup>-6</sup>	7.9×10 <sup>-4</sup> /3.9×10 <sup>-7</sup>	6.6×10 <sup>-3</sup> /3.3×10 <sup>-6</sup>	6.1×10 <sup>-3</sup> /3.1×10 <sup>-6</sup>	3.0×10 <sup>-3</sup> /1.5×10 <sup>-6</sup>
<i>Nonradiological impacts</i>							
Vehicle emissions (LCFs)	4.9×10 <sup>-4</sup>	8.0×10 <sup>-3</sup>	6.9×10 <sup>-3</sup>	1.4×10 <sup>-3</sup>	9.9×10 <sup>-3</sup>	9.2×10 <sup>-3</sup>	4.0×10 <sup>-3</sup>
Fatalities	0.005	0.024	0.021	0.007	0.028	0.026	0.015
KANSAS							
<i>Shipments</i>							
Truck (originating/total)	396/396	0/0	0/0	0/0	0/0	0/0	0/0
Rail (originating/total)	0/0	63/4,253	63/4,253	63/4,249	63/4,310	63/4,253	63/4,253
<i>Radiological impacts</i>							
Incident-free impacts							
Population (person-rem/LCFs) <sup>h</sup>	6.0×10 <sup>0</sup> /3.0×10 <sup>-3</sup>	1.7×10 <sup>1</sup> /8.4×10 <sup>-3</sup>	1.7×10 <sup>1</sup> /8.4×10 <sup>-3</sup>	1.8×10 <sup>1</sup> /9.2×10 <sup>-3</sup>	1.7×10 <sup>1</sup> /8.5×10 <sup>-3</sup>	1.7×10 <sup>1</sup> /8.4×10 <sup>-3</sup>	1.7×10 <sup>1</sup> /8.4×10 <sup>-3</sup>
Workers (person-rem/LCFs)	2.6×10 <sup>1</sup> /1.0×10 <sup>-2</sup>	8.3×10 <sup>1</sup> /3.3×10 <sup>-2</sup>	8.3×10 <sup>1</sup> /3.3×10 <sup>-2</sup>	8.6×10 <sup>1</sup> /3.5×10 <sup>-2</sup>	8.4×10 <sup>1</sup> /3.4×10 <sup>-2</sup>	8.3×10 <sup>1</sup> /3.3×10 <sup>-2</sup>	8.3×10 <sup>1</sup> /3.3×10 <sup>-2</sup>
Accident dose risk							
Population (person-rem/LCFs)	2.4×10 <sup>-4</sup> /1.2×10 <sup>-7</sup>	7.9×10 <sup>-3</sup> /3.9×10 <sup>-6</sup>	7.9×10 <sup>-3</sup> /3.9×10 <sup>-6</sup>	8.7×10 <sup>-3</sup> /4.3×10 <sup>-6</sup>	8.0×10 <sup>-3</sup> /4.0×10 <sup>-6</sup>	7.9×10 <sup>-3</sup> /3.9×10 <sup>-6</sup>	7.9×10 <sup>-3</sup> /3.9×10 <sup>-6</sup>
<i>Nonradiological impacts</i>							
Vehicle emissions (LCFs)	4.6×10 <sup>-4</sup>	8.5×10 <sup>-3</sup>	8.5×10 <sup>-3</sup>	9.3×10 <sup>-3</sup>	8.6×10 <sup>-3</sup>	8.5×10 <sup>-3</sup>	8.5×10 <sup>-3</sup>
Fatalities	0.003	0.049	0.049	0.051	0.050	0.049	0.049
NEBRASKA							
<i>Shipments</i>							
Truck (originating/total)	532/40,799	0/1,079	0/1,079	0/1,079	0/1,079	0/1,079	0/1,079
Rail (originating/total)	0/0	103/7,657	103/7,657	103/7,097	103/7,714	103/7,657	103/7,657
<i>Radiological impacts</i>							
Incident-free impacts							
Population (person-rem/LCFs) <sup>h</sup>	6.4×10 <sup>2</sup> /3.2×10 <sup>-1</sup>	6.2×10 <sup>1</sup> /3.1×10 <sup>-2</sup>	6.2×10 <sup>1</sup> /3.1×10 <sup>-2</sup>	5.9×10 <sup>1</sup> /2.9×10 <sup>-2</sup>	6.3×10 <sup>1</sup> /3.1×10 <sup>-2</sup>	6.2×10 <sup>1</sup> /3.1×10 <sup>-2</sup>	6.2×10 <sup>1</sup> /3.1×10 <sup>-2</sup>
Workers (person-rem/LCFs)	2.0×10 <sup>3</sup> /7.8×10 <sup>-1</sup>	3.9×10 <sup>2</sup> /1.6×10 <sup>-1</sup>	3.9×10 <sup>2</sup> /1.6×10 <sup>-1</sup>	3.7×10 <sup>2</sup> /1.5×10 <sup>-1</sup>	4.0×10 <sup>2</sup> /1.6×10 <sup>-1</sup>	3.9×10 <sup>2</sup> /1.6×10 <sup>-1</sup>	3.9×10 <sup>2</sup> /1.6×10 <sup>-1</sup>
Accident dose risk							
Population (person-rem/LCFs)	3.0×10 <sup>-2</sup> /1.5×10 <sup>-5</sup>	3.9×10 <sup>-2</sup> /2.0×10 <sup>-5</sup>	3.9×10 <sup>-2</sup> /2.0×10 <sup>-5</sup>	3.6×10 <sup>-2</sup> /1.8×10 <sup>-5</sup>	4.0×10 <sup>-2</sup> /2.0×10 <sup>-5</sup>	3.9×10 <sup>-2</sup> /2.0×10 <sup>-5</sup>	3.9×10 <sup>-2</sup> /2.0×10 <sup>-5</sup>
<i>Nonradiological impacts</i>							
Vehicle emissions (LCFs)	5.7×10 <sup>-2</sup>	2.4×10 <sup>-2</sup>	2.4×10 <sup>-2</sup>	2.3×10 <sup>-2</sup>	2.4×10 <sup>-2</sup>	2.4×10 <sup>-2</sup>	2.4×10 <sup>-2</sup>
Fatalities	0.83	0.18	0.18	0.17	0.18	0.18	0.18

- a. Under the mostly rail scenario, rail shipments would arrive in Nevada at one of six existing rail nodes. Impacts would vary according to the node. From that node, DOE would use one of the rail or heavy-haul implementing alternatives to complete the transportation to Yucca Mountain (see Section J.1.2).
- b. For heavy-haul truck transportation, the Caliente junction is the location of the proposed Caliente intermodal transfer station for heavy-haul trucks near the town of Caliente in eastern Nevada. Rail shipments terminating at this junction would continue to Yucca Mountain on heavy-haul trucks on one of the Caliente, Caliente/Chalk Mountain, or Caliente/Las Vegas routes. For branch rail line transportation, railcars would transfer via the Caliente Option to the Caliente Corridor at the Caliente junction.

**Table J-75.** Estimated transportation impacts for the States of Colorado, Kansas, and Nebraska (page 2 of 2).

- c. For heavy-haul truck transportation, the Dry Lake junction is near the location of the proposed Apex/Dry Lake intermodal transfer station for heavy-haul trucks in southeast Nevada. Rail shipments terminating at this junction would continue to Yucca Mountain on heavy-haul trucks on the Apex/Dry Lake route.
- d. For heavy-haul truck transportation, the Jean junction is near the location of the proposed Sloan/Jean intermodal transfer station for heavy-haul trucks in southern Nevada. Rail shipments terminating at this junction would continue to Yucca Mountain on heavy-haul trucks on the Sloan/Jean route. For branch rail line transportation, railcars would transfer from the mainline railroad via the Wilson Pass or Stateline Pass Option of the Jean Corridor, near the Jean junction.
- e. For branch rail line transportation, railcars would transfer from the mainline railroad at the Beowawe junction in north-central Nevada to the Carlin Corridor.
- f. For branch rail line transportation, railcars would transfer from the mainline railroad at the Eccles junction east of Caliente, Nevada, via the Eccles Option or nearby via the Crestline Option of the Caliente or Caliente-Chalk Mountain Corridor. Impacts in states outside Nevada would be the same for the Eccles and Crestline Options of the Caliente and Caliente-Chalk Mountain Corridors.
- g. For branch rail line transportation, railcars would transfer from the mainline railroad at the Apex junction in southeast Nevada, possibly via the Valley Connection, to the Valley Modified Corridor.
- h. LCF = latent cancer fatality.



**Figure J-35.** Highway and rail routes used to analyze transportation impacts - Colorado, Kansas, and Nebraska.

**Table J-76.** Estimated transportation impacts for the States of Connecticut, Rhode Island, and New York (page 1 of 2).

Impact category	Mostly legal-weight truck	Mostly rail					
		Ending rail node in Nevada <sup>a</sup>					
		Caliente <sup>b</sup>	Dry Lake <sup>c</sup>	Jean <sup>d</sup>	Beowawe <sup>e</sup>	Eccles <sup>f</sup>	Apex <sup>g</sup>
CONNECTICUT							
<i>Shipments</i>							
Truck (originating/total)	1,247/1,247	0/0	0/0	0/0	0/0	0/0	0/0
Rail (originating/total)	0/0	295/295	295/295	295/295	295/295	295/295	295/295
<i>Radiological impacts</i>							
<i>Incident-free impacts</i>							
Population (person-rem/LCFs) <sup>h</sup>	1.5×10 <sup>1</sup> /7.5×10 <sup>-3</sup>	9.1×10 <sup>0</sup> /4.6×10 <sup>-3</sup>	9.1×10 <sup>0</sup> /4.6×10 <sup>-3</sup>	9.1×10 <sup>0</sup> /4.6×10 <sup>-3</sup>	9.1×10 <sup>0</sup> /4.6×10 <sup>-3</sup>	9.1×10 <sup>0</sup> /4.6×10 <sup>-3</sup>	9.1×10 <sup>0</sup> /4.6×10 <sup>-3</sup>
Workers (person-rem/LCFs)	3.4×10 <sup>1</sup> /1.4×10 <sup>-2</sup>	1.7×10 <sup>1</sup> /7.0×10 <sup>-3</sup>	1.7×10 <sup>1</sup> /7.0×10 <sup>-3</sup>	1.7×10 <sup>1</sup> /7.0×10 <sup>-3</sup>	1.7×10 <sup>1</sup> /7.0×10 <sup>-3</sup>	1.7×10 <sup>1</sup> /7.0×10 <sup>-3</sup>	1.7×10 <sup>1</sup> /7.0×10 <sup>-3</sup>
<i>Accident dose risk</i>							
Population (person-rem/LCFs)	8.2×10 <sup>-3</sup> /4.1×10 <sup>-6</sup>	1.6×10 <sup>-1</sup> /8.2×10 <sup>-5</sup>	1.6×10 <sup>-1</sup> /8.2×10 <sup>-5</sup>	1.6×10 <sup>-1</sup> /8.2×10 <sup>-5</sup>	1.6×10 <sup>-1</sup> /8.2×10 <sup>-5</sup>	1.6×10 <sup>-1</sup> /8.2×10 <sup>-5</sup>	1.6×10 <sup>-1</sup> /8.2×10 <sup>-5</sup>
<i>Nonradiological impacts</i>							
Vehicle emissions (LCFs)	6.5×10 <sup>-3</sup>	3.4×10 <sup>-3</sup>	3.4×10 <sup>-3</sup>	3.4×10 <sup>-3</sup>	3.4×10 <sup>-3</sup>	3.4×10 <sup>-3</sup>	3.4×10 <sup>-3</sup>
Fatalities	0.005	0.135	0.135	0.135	0.135	0.135	0.135
RHODE ISLAND							
<i>Shipments</i>							
Truck (originating/total)	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Rail (originating/total)	0/0	0/0	0/0	0/0	0/0	0/0	0/0
<i>Radiological impacts</i>							
<i>Incident-free impacts</i>							
Population (person-rem/LCFs) <sup>h</sup>	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Workers (person-rem/LCFs)	0/0	0/0	0/0	0/0	0/0	0/0	0/0
<i>Accident dose risk</i>							
Population (person-rem/LCFs)	0/0	0/0	0/0	0/0	0/0	0/0	0/0
<i>Nonradiological impacts</i>							
Vehicle emissions (LCFs)	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Fatalities	0/0	0/0	0/0	0/0	0/0	0/0	0/0
NEW YORK							
<i>Shipments</i>							
Truck (originating/total)	2,571/5,287	426/580	426/580	426/580	426/580	426/580	426/580
Rail (originating/total)	0/0	350/861	350/861	350/861	350/861	350/861	350/861
<i>Radiological impacts</i>							
<i>Incident-free impacts</i>							
Population (person-rem/LCFs) <sup>h</sup>	6.3×10 <sup>1</sup> /3.2×10 <sup>-2</sup>	3.1×10 <sup>1</sup> /1.6×10 <sup>-2</sup>	3.1×10 <sup>1</sup> /1.6×10 <sup>-2</sup>	3.1×10 <sup>1</sup> /1.6×10 <sup>-2</sup>	3.1×10 <sup>1</sup> /1.6×10 <sup>-2</sup>	3.1×10 <sup>1</sup> /1.6×10 <sup>-2</sup>	3.1×10 <sup>1</sup> /1.6×10 <sup>-2</sup>
Workers (person-rem/LCFs)	1.6×10 <sup>2</sup> /6.2×10 <sup>-2</sup>	6.7×10 <sup>1</sup> /2.7×10 <sup>-2</sup>	6.7×10 <sup>1</sup> /2.7×10 <sup>-2</sup>	6.7×10 <sup>1</sup> /2.7×10 <sup>-2</sup>	6.7×10 <sup>1</sup> /2.7×10 <sup>-2</sup>	6.7×10 <sup>1</sup> /2.7×10 <sup>-2</sup>	6.7×10 <sup>1</sup> /2.7×10 <sup>-2</sup>
<i>Accident dose risk</i>							
Population (person-rem/LCFs)	7.0×10 <sup>-3</sup> /3.5×10 <sup>-6</sup>	4.9×10 <sup>-2</sup> /2.4×10 <sup>-5</sup>	4.9×10 <sup>-2</sup> /2.4×10 <sup>-5</sup>	4.9×10 <sup>-2</sup> /2.4×10 <sup>-5</sup>	4.9×10 <sup>-2</sup> /2.4×10 <sup>-5</sup>	4.9×10 <sup>-2</sup> /2.4×10 <sup>-5</sup>	4.9×10 <sup>-2</sup> /2.4×10 <sup>-5</sup>
<i>Nonradiological impacts</i>							
Vehicle emissions (LCFs)	1.4×10 <sup>-2</sup>	1.3×10 <sup>-2</sup>	1.3×10 <sup>-2</sup>	1.3×10 <sup>-2</sup>	1.3×10 <sup>-2</sup>	1.3×10 <sup>-2</sup>	1.3×10 <sup>-2</sup>
Fatalities	0.042	0.122	0.122	0.122	0.122	0.122	0.122

- a. Under the mostly rail scenario, rail shipments would arrive in Nevada at one of six existing rail nodes. Impacts would vary according to the node. From that node, DOE would use one of the rail or heavy-haul implementing alternatives to complete the transportation to Yucca Mountain (see Section J.1.2).
- b. For heavy-haul truck transportation, the Caliente junction is the location of the proposed Caliente intermodal transfer station for heavy-haul trucks near the town of Caliente in eastern Nevada. Rail shipments terminating at this junction would continue to Yucca Mountain on heavy-haul trucks on one of the Caliente, Caliente/Chalk Mountain, or Caliente/Las Vegas routes. For branch rail line transportation, railcars would transfer via the Caliente Option to the Caliente Corridor at the Caliente junction.

**Table J-76.** Estimated transportation impacts for the States of Connecticut, Rhode Island, and New York (page 2 of 2).

- c. For heavy-haul truck transportation, the Dry Lake junction is near the location of the proposed Apex/Dry Lake intermodal transfer station for heavy-haul trucks in southeast Nevada. Rail shipments terminating at this junction would continue to Yucca Mountain on heavy-haul trucks on the Apex/Dry Lake route.
- d. For heavy-haul truck transportation, the Jean junction is near the location of the proposed Sloan/Jean intermodal transfer station for heavy-haul trucks in southern Nevada. Rail shipments terminating at this junction would continue to Yucca Mountain on heavy-haul trucks on the Sloan/Jean route. For branch rail line transportation, railcars would transfer from the mainline railroad via the Wilson Pass or Stateline Pass Option of the Jean Corridor, near the Jean junction.
- e. For branch rail line transportation, railcars would transfer from the mainline railroad at the Beowawe junction in north-central Nevada to the Carlin Corridor.
- f. For branch rail line transportation, railcars would transfer from the mainline railroad at the Eccles junction east of Caliente, Nevada, via the Eccles Option or nearby via the Crestline Option of the Caliente or Caliente-Chalk Mountain Corridor. Impacts in states outside Nevada would be the same for the Eccles and Crestline Options of the Caliente and Caliente-Chalk Mountain Corridors.
- g. For branch rail line transportation, railcars would transfer from the mainline railroad at the Apex junction in southeast Nevada, possibly via the Valley Connection, to the Valley Modified Corridor.
- h. LCF = latent cancer fatality.